DOCUMENT RESUME

ED 089 696 IR 000 408

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TITLE	A Survey of New Communications Technologies and Their Uses.
INSTITUTION	Council of Europe, Strasbourg (France). Committee for Out-of-School Education and Cultural Development.
REPORT NO	CCC/DC-73-111
PUB DATE	19 Nov 73
NOTE	50p.
EDRS PRICE	MF-$0.75 HC-$3.15 PLUS POSTAGE
DESCRIPTORS	Bibliographic Citations; Cable Television; *Communication Satellites; Foreign Countries; *National Surveys; *Organizations (Groups); *Program Descriptions; *Telecommunication; Video Cassette Systems
IDENTIFIERS	Canada; Europe; United States

ABSTRACT

The present survey focuses on certain major developments in various countries which are of immediate relevance to the production, distribution, reception and uses of new communications technologies and media; i.e., satellite communications, cable television, videograms and new forms of video-production. Technical explanations have been avoided, except where they are essential for an understanding of social, legal and other implications. Information is provided on concerned institutions and organizations. The selection of listed documentation has been based on recognized, authoritative studies. While it has proved possible to provide a fairly complete account of the situation with regard to satellite communication, a complete account of the cable television situation in each country would not be possible in the framework of this survey. Information is provided on current and foreseen uses and services. With regard to videograms, the information concentrates on software aspects. Completing the survey, mention is made of the more authoritative, policy oriented studies of the foreseeable technical developments in the communications field and their implications for society and the individual. (Author/SL)

COUNCIL
OF
EUROPE
STRASBOURG

NEW COMMUNICATIONS TECHNOLOGIES AND THEIR USES

OUNCIL FOR CULTURAL CO-OPERATION
OMMITTEE FOR OUT-OF-SCHOOL EDUCATION AND CULTURAL DEVELOPMENT

ED 089696

Strasbourg 19 November 1973

CCC/DC (73) 111
Or. Engl.

COMMITTEE FOR OUT-OF-SCHOOL EDUCATION
AND CULTURAL DEVELOPMENT

A survey of

NEW COMMUNICATIONS TECHNOLOGIES AND THEIR USES

carried out by

The International Broadcast Institute

under the direction of
Edward W Ploman

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I PREFACE

1. The survey of new communications technologies and media has been conducted with the co-operation of a number of institutions and individuals, in particular with the assistance of the Centre de la Recherche, Office de la Radiodiffusion Television Francaise.

During the work on the survey it soon became clear that there are more on-going activities, studies and experiements than could be accommodated within the limited scope of this survey. However, much of the available material is not easily obtainable or scattered among a great number of national and international public institutions or private bodies, and generally not brought together in comprehensive studies or surveys. At the same time a number of institutions, both national and international, are now collecting material; while these activities are often overlapping, each institution not only collects but also synthesizes and uses the material in terms of its own requirements and policies.

The present survey focusses on certain major developments which are of immediate relevance to the production, distribution, reception and uses of new communications technologies and media, i.e. satellite communications, cable television, videograms, new forms of video-production. In general, technical explanations have been avoided, except in those cases where they are essential for an understanding of social, legal and other implications. Information is provided on concerned institution and organisations. The selection of listed documentation has been based on recognized, authoritative o otherwise significant studies; in those cases where little material is available, indication has been given of known material.

While it has proved possible to provide a fairly complete account of the situation with regard to satellit communication, a complete account of the cable television situation in each country would not be possib within the framework of this survey. Information is provided on current and foreseen uses and service with more detailed indications from those countries where cable systems have been extensively used. With regard to videograms, the information concentrates on software aspects and does not include a description of the various hardware systems.

2. The main conclusions to be drawn in connection with this survey are the following:
(a) While certain aspects of each of the new technologies and media may be studied by itself, the implications and current or proposed uses cannot be investigated in isolation but must be seen in terms of an overall approach particularly taking into account the relationship between the various existing and evolving media, the institutional and legal frameword, their interdependence and interaction.

This in turn implies the need for comprehensive communications or media policies, since decisions in one sector will affect activities in other sectors.

(b) Policy-oriented studies or forecasts need a much stronger emphasis in user requirements and needs than is now the case. There seems to be a need for:
-studies of the needs and requirements of users whether societies, groups or individuals in order to provide a basis for technical research and development work, for elaboration of policy and for planning decisions
-studies of and assistance to experiments and pilot projects
-studies of implications of the new media at the institutional and legal levels with regard to such aspects of structures, public regulation, copyright legislation which generally are obsolete based on earlier technologies
-studies of communications media and technologies should be related to and undertaken in relation to other immediately concerned social sectors such as education and culture; distribution of textual information (mail, press, etc.); urban and regional planning.

II. SATELLITE COMMUNICATIONS

1. General Space technology has been used for communication purposes for only somewhat over a decade. During this period, technology has advanced enough for satellite communications systems to have become a technically and economically viable complement or alternative to terrestrial telecommunications systems, capable of providing otherwise unavailable services.

It is important to note the distinction made between communication satellite systems and broadcasting satellite systems. In the first case the signals are transmitted between earth stations connected to terrestrial networks or local transmitting facilities. In the second case, the satellite signal is intended for reception by the general public, i.e. without the use of earth stations. Such direct reception is foreseen by simple domestic receiving sets, in particular if equipped with small antenna or through community reception using more complex receiving equipment. Such community reception may be intended for use by a group of the general public at one location (e.g. a school class) or through a distribution system covering a limited area (e.g. several classes in a school complex).

At present there are no plans for systems allowing direct reception on existing, unaugmented television sets, nor for other types of individual reception. Also, currently planned systems which are all intended for community reception, would provide for various kinds of reception modes at the same time
-in densely populated areas through medium-sized earth stations for retransmission of the satellite signal either through normal television transmitters or through cable systems
-in areas with sparse or isolated populations, or with difficult geographical characteristics through direct community reception.

Documentation There is now a rather extensive literature on different aspects of satellite communication. The following works have been selected as providing basic information:

Feldman, Nathaniel E. and Kelly Charles M.: Communication Satellites for the 1970's: Systems Progress in Astronautics, Volume 26 MIT Press, Cambridge Mass, 1971

A collection of technical papers selected from the AIAA 3rd Communications Satellite Conference, April 1970, subsequently revised for this volume. The papers represent an overview of international research and analysis of the communications satellite field.

Gatland, K.W., ed: Telecommunications Satellites; Illife Books Ltd., London/Prentice Hall Inc. Englewood Cliffe, N.J., 1964

This basic work comprises the following sections: theory, practice, ground stations, satellites economics.

International Telecommunications Union: Telecommunications Journal, Special Space Number Vol. 38 No. V. May 1971. Comprises a number of articles covering various aspects of space communication and includes as supplement a table of artificial satellites launched from 1957 to 1970 and a map of earth stations for telecommunication services.

Pierre, J.R. The Beginnings of Satellite Communications, History of Technology Monographs San Francisco Press, Inc., San Francisco, California 1968

A succinct account of beginnings of and first experiments in satellite communication by one of the pioneers in the field.

2. Communications Satellite Systems Such satellite systems are used for all kinds of telecommunication services, including radio and television transmission. For the information media they do not represent a radical departure from present practices since the distribution of material to the public is as previously handled by the national media institutions. They do, however, provide improved service compared to conventional methods in terms of capacity, long-distance transmission and flexibility in

use. These systems therefore serve to interconnect, supplement, extend and complement existing communications networks. Existing and planned systems are:

- at the international level : Intelsat, Intersputnik
- at the national level (Orbita, ANIK)
- at the regional level (planned system in Europe)

2.1. International At the international level, there are at present only two systems for civilian communications.

2.1.1. Intelsat Following the provisional agreements of 1964, the International Telecommunications Satellite Organisation, "Intelsat", was definitely established in 1971. The main purpose of Intelsat is to continue and carry forward on a definitive basis the development, establishment and operation of the space segment of an international telecommunications satellite system with servic to be made available to all areas of the world on a non-discriminatory basis. The earth stations are established and operated by individual countries or groups of countries.

The Intelsat system uses US designed and built geostationary satellites. The Organization now comprises some 85 countries and there are earth station in some 60 countries.

On request and according to special conditions, Intelsat may also provide specialized telecommunications services for other than military purposes; to these services are counted inter alia satellite broadcast services. At present the US Communications Satellite Corporation, Comsat, acts as manager for the Intelsat system.

Documentation:

i) The Agreements Relating to the International Telecommunications Satellite Organization "Intelsat" (the Intelsat definitive agreements) have been published by Department of State, Washington, D.C. August 20, 1971.

ii) With regard to the development of the system, technical aspects, etc. regular releases and other documentation is provided by Comsat as the manager of Intelsat. (see below)

iii) There is a relatively abundant documentation available on the creation and history of Intelsat, as well as on legal, political and other aspects of these agreements; see in particular:

Chayes, Abram, Ehrlich., Thomas and Lowenfeld, Andreas:
"An international operating agency: The Communications Satellite Corporation and the International Consortium for Satellite Communications, in International Legal Process". Little, Brown and Company, New York, 1971.

Colino, Richard:
"Proposed Regional Satellite Systems: Will they be compatible with Intelsat?" 4th Eurospace U.S. - European Conference, 22nd - 25th September 1970. Venice.

Galloway, Johnathon:
"The Transition between the Interim and Definitive Arrangements for a Global Commercial Communications Satellite System." AIAA 3rd Communications Satellite Systems Conference. Los Angeles, California, April 6-8, 1970.

Johnson, John A.:
"Organization and activities of the International Telecommunications Satellite Consortium." Space Exploration and Applications; papers presented at the United Nations Conference on the Exploration and Peaceful Uses of Outer Space, Vienna, 14-27 August 1968, Vol. 2. United Nations, New York, 1969.

2.1.2. Intersputnik In 1968, the USSR published a proposed agreement for the creation of Intersputnik, and international communications satellite system.

In 1971, a revised agreement was signed in Moscow by nine States (Bulgaria, Czechoslovakia, C German Democratic Republic, Hungary, Mongolia, Poland, Rumania and USSR).

The organisation is open to all countries. The organisations will comprise a General Assembly and an international Secretariat led by a Director General. As in the Intelsat system, the space segment will be jointly owned while the ground equipment is owned and operated by each member State.

The Intersputnik system will be developed according to several distinct phases. In the first phas operations will be based on the use of the USSR developed and operated Molniya satellites. In a second stage, a geostationary satellite, Statsionar, devloped by the USSR will be used in an orbit over the Indian Ocean.

Documentation:

i) The Intersputnik agreements have been issued by the USSR Ministry of Foreign Affairs; see al UN document A/AC. 105/46 of 9 August 1968

ii) There is relatively little documentation published in other languages than Russian on the Intersputnik system (for documentation on the Orbita system and the Molniya satellites, see unde USSR).

Petrov, I. :
"Intersputnik" international space communication system and organisation. Telecommunications Journal Vol. 39-XI/1972.

Vereschetine, V.S. :
Intersputnik : organisation et système internationaux de télécommunications spatiales.
La Recherche Spatiale, Juin 1973.

2.2. National Systems

2.2.1. Orbita The first national satellite system in the world was inaugurated in 1967 by the USSR. The system uses the Molnyia satellites for which an elliptic orbit was chosen in order to cover th whole of the USSR territory, including extremely northern latitudes.

The ground segment comprises two main stations for transmission and reception located in Moscow and Vladivostok and about 35 medium-sized receiving earth stations located in Siberia an the Central Asian Republic.

The system is used for both telecommunication purposes and for transmission of television programmes to receiving stations connected to local TV transmitters; it basically functions as a distribution-type system.

Orbita is operated by the USSR Ministry of Post and Telecommunications.

Documentation:

Kantor, L.J. and Borodich S.V. :
Orbita Satellite Communication System. Space Exploration and Applications; papers presented at the United Nations Conference on the Exploration and Peaceful Uses of Outer Space, Vienna, 14-27 August, 1968, Vol. 2. United Nations, New York, 1969.

Kaplanov, M.R.:
Communication Satellite Molniya - I.
op. cit.

Krivosheyev, M.I. ;
The role of space achievements in the development of television broadcasting in the USSR.
op. cit.

.2.2. ANIK

The second domestic satellite system was established in Canada, in 1972/73. It uses geostationary satellites under the name of ANIK developed by the US company Hughes Aircraft Corporation in co-operation with Canadian Industries.

The system is designed to provide telecommunication services, particularly to the northern parts of the country and to distribute television programmes in the two national languages to the whole country. The system functions basically as a distribution-type system so that television programmes are received on earth station connected with local transmitters for rebroadcast. A number of different kinds of earth stations have been developed.

ANIK is owned and operated by Telesat Canada, a corporation set up according to an Act by Parliament. The shares in Telesat Canada are owned with equal parts by the Government, private telecommunication carriers and the public.

Concerned Organisations :

Canadian Broadcasting Corporation, 1500 Bronson Avenue, Ottawa, Ontario, K1G 3J5.

Canadian Radio and Television Commission, 100 Metcalfe Street, Ottawa, Ontario, K1A ON2.

Department of Communications, 100 Metcalfe Street, Ottawa, Ontario, K1A ON2.

Telesat Canada, 333 River Road, Vanier, Ottawa, 7 Ontario.

Documentation:

Blevis, B.C. and Card, M.L.:
The Implications of Satellite Technology for Television Broadcasting in Canada.
AIAA 4th Communications Satellite Systems Conference. Washington D.C., April 24-26 1972.
American Institute of Aeronautics and Astronautics.

Chinnick, Robert :
The Canadian Telecommunications Satellite System. Presented at the Symposium of Communications Satellites, University of Southampton; organised by the British Interplanetary Society, 19-20 September, 1972.

Drury, C.M. :
A White Paper on : A Domestic Satellite Communication System for Canada. Roger Duhamel, Ottawa, March 1968.

Siocos, C.A. :
Network Distribution of Television by Satellite. AIAA 3rd Communications Satellite Systems Co Los Angeles, California, April 6-8, 1970.

Telesat Canada : .
A Canadian Satellite Communications System. Telesat Canada, Ottawa, Ontario, February 1971.

.2.3. USA
.3.1.

US arrangements for international satellite communications

The Communications Satellite Act of 1962 provides for ownership and operation of the US portion of the Intelsat system by a private corporation, Communications Satellite Corporation (Comsat) organised according with the statute and subject to federal regulation. The original shares were purchased in equal parts by communications common carriers and the general public; most of the carriers have since sold their stock to the general public.

Apart from representing the USA in Intelsat, Comsat also acts as manager of the Intelsat Space segment. In Partnership with US international common carriers (A.T&T, ITT, RCA etc.)

Comsat also operates earth stations in the US including Hawaii, Puerto Rico and Guam.

Communications Satellite Corporation, 950 L'Enfant Plaza, SW Washington D.C. 20024, USA.

Documentation :
Comsat : Reports of Annual Meetings of Shareholders from 1963 and onwards.
Comsat : Reports to the President and theCongress from 1963 onwards.

2.2.3.2. Domestic Systems

The Communications Satellite Act only made provisions for US participation in the international communication satellite system. The question of domestic satellite systems was not solved until 1972, when FCC, following a policy statement by the President, adopted rules concerning "the establishment of domestic communications - satellite service following authorisation by the FCC.

At that stage, FCC had before it eight applications (American Telegraph and Telephone Company (A. T&T), Comsat, Fairchild Hiller Corporation, General Telephone and Electronics Corporatio (GT&E), Hughes Aircraft Company, Radio Corporation of America (RCA), Western Tele-Communications Inc. (WTIC) and Western Union Telegraph.

As of this date, FCC has authorised seven applications.

Organisations

a) Federal Communications Commission is the federal regulatory agency for non-governmental communications, 1919 M. Street N.W., Washington D.C. 20544

b) Other concerned organisations include:
- aerospace and telecommunications enterprises
- operating telecommunication and broadcasting enterprises
- other concerned institutions or groups such as American Institute of Aeronautics and Astronautics, Ford Foundation, etc.

Documentation:
Eldridge, R.A., Hudfield, B.H. and Talbot Jr., M.P.
Summary of the Domestic Communications-Satellite Applications, Mitre Corporation. This summary provides an overview and a comparison between the various proposals before the FCC. Bedford, Mass. August 1971

Federal Communications Commission

- Domestic Communications - Satellite Facilities; Proposed Establishment by Non-Governmental Entities, Federal Register, Vol. 37, No. 56, Part II, Washington D.C. March 22 1972.
- Second Report and Order; in the Matter of Establishment of Domestic Communications-Satellit Facilities by Non-Governmental Entities, Docket No. 16495, June 16 1972.
- Memorandum Opinion and Order, in the matter of Establishment of Domestic Communications-Satellite Facilities by Non-Governmental Entities, Docket No. 16495, December 21 1972.

2.3. Regional Systems

At present there is no regional communications satellite system in operation but plans are going ahead in Europe.

2.3.1. European Regional Satellite System

Following a number of studies undertaken by various European organisations concerned with

satellite communications, the Council of ESRO in December 1971 approved a space applications programme which includes a communications satellite programme.

The objectives of this communication satellite programme are to fulfill the 1980 requirements of:

- the telecommunication administration for the routing of the intra-European telecommunications traffic - telephone, telex, data transmission etc. - over distances of at least 800kms
- the broadcasting organisations for the transmission of Eurovision and other programmes.

An experimental satellite - OTS - is under development and the launch is foreseen for 1976. The operational satellite - ECS - is expected to be ready by 1980.

The earth stations to work with this distribution on-type satellite will be of medium size and used for transmission and reception. All participating countries are expected to establish an earth station as near as possible to the capitals.

One of the most important advantages of such a European satellite system will be the possibility to extend the broadband network which is required for television interconnection to such countries as Iceland which otherwise cannot be linked-up and to the southern and eastern shore of the Mediterranean (e.g. Rabat, Algiers, Tunis, Nicosia, Beirut, Tel Aviv, etc.)

No decisions have been made with regard to organisational structure. It is expected that the space segment will be established, owned and operated by a common organisation while the earth stations will be the responsibility of each country.

2.3.2. Organisations

There are a great number of organisations at the European level which in various respects have been, or are concerned with the development or use of a European satellite system. The most significant are the following.

2.3.2.1. Inter-Governmental Organisations

ELDO

a) The European Launcher Development Organisation, ELDO, was created in 1962 with the objective to develop a European launcher capacity. For various reasons, this programme proved less than successful. In 1972 Eldo was dissolved as an independent organisation. Its tasks will be taken over by the new European space organisation which will group all those previously set up at the governmental level.

b) ESRO

The European Space Research Organisation, ESRO, was created in 1964. While its objectives in the beginning were focussed on scientific programmes, it has become the main functional European space organisation with a programme which now is heavily turned towards space organisations. The application programme which was adopted in 1972 comprises a navigational satellite system, a meteorological satellite system and a communications satellite system.

ESRO, 114 Avenue Charles-de-Gaulle, 92 Neuilly-sur-Seine, France.

c) European Space Conference

The European Space Conference (ECS) was set up in 1967 so as to provide coordination between the various European space organisations at the ministerial level. Apart from issues relating to the structure to be given the common space programmes, the ECS has also undertaken studies of various application programmes, among them the communications satellite project. The ECS secretariat is held by various countries in turn.

d) European Space Agency (ESA)

In July, 1973, the members of ECS agreed to create a European Space Agency by merging ELDO and ESRO. The Agency will be set up by 1 April, 1974.

e) CEPT

The European Conference of Post and Telecommunications, CEPT, is a regional organisation of the post and telecommunications administrations of Western Europe. In the satellite field, CEPT fulfills a number of coordinating functions with regard to the European policies concerning conditions of use of the Intelsat system, in particular tariff policies.

CEPT has also undertaken a number of studies with regard to a European satellite system.

CEPT and its members will play important roles with regard to the European satellite system. On the one hand, the administrations will be directly concerned with the operation of the system. On the other hand, the administrations will be the most important users of the system.

The CEPT also set up the CETS - European Telecommunications Satellite Conference - originally to coordinate views on the Intelsat negotiations but later also to conduct certain studies on a regional satellite system. CETS was, however, dissolved some years ago.

2.3.2.2. Industrial Organisations

a) Eurospace

Eurospace is an organisation of European companies in the aerospace, electronic and other fields. Its aim is to provide a focal point to coordinate industrial opinion on matters of space developments and related problems. Legal and information services are available to members and associates amongst whom are a number of US companies.

Eurospace, 8-10 Rue Cognacq-Jay, Paris 7eme, France.

b) Eurosat

Eurosat is a privately funded international company aimed at carrying out management and operation of application satellite systems for customers in Europe and other regions of the world. Its shareholders are drawn from the aerospace, electronic and public services industries as well as banks of nine countries in Europe.

Eurosat, 24 route des Acacias, 1211 Geneva, Switzerland.

2.3.2.3. User Organisations

a) EBU

Apart from the CEPT and its members, the EBU is the most important organisation at a regional level representing user interests, in this case the broadcasting organisations of the countries primarily in Western Europe.

The EBu and its members organisations are involved in various aspects of satellite communicatio Negotiations with the concerned institutions concerning tariffs and other conditions for the use of facilities within the Intelsat system; studies and continuing contacts concerning a future European satellite system, etc.

EBU, 1 rue de Varembe, CH-1211, Geneva 20, Switzerland.

Documeatation:

Much of the relevant information is contained in reports, minutes, resolutions, etc. of the European organisations involved in space matters.

Further information in:

Altovsky, V.A. and Chaumeron, J. :
Status of European Communications Projects. Paper presented at the AIAA 2nd Communications Satellite Systems Conference. San Francisco, California, April 8-10, 1968.

Bondi, H.
The European Programme of Application Satellites, 4th Eurospace U.S. - European Conference. 22nd-25th September, 1970, Venice.

Pardoe, G.K.C. and Steines, L.W. :
Regional and Global Implications of a European Satellite Communications System. AIAA Paper presented at the 2nd AIAA Communications Satellite Systems Conference. San Francisco, California, April 8-10, 1968.

Tassin, Jacques
Vers l'Europe spatiale, Dendel, Paris, 1970.

2.4. Other Projects

2.4.1. Symphonie

In June 1967, the French and German governments agreed on a joint communications satellite project, known as Symphonie. The intention is to develop one prototype and two flight models.

The project has the following main objectives:

a) to gain technical experience in the development and application of communications satellites

b) to improve the experience of the European aerospace industry for further participation in similar international projects

c) to perform an experimental programme of television, voice and telephone transmissions

One of the objectives of the project is to investigate methods for the exchange of television programmes in regions which have developed, but over-utilized terrestrial network (Europe), to establish television connection between France and French-speaking countries and to study educational television transmissions via satellite.

It is expected that the flight models will be launched by 1975.

The Symphonie satellites are intended to work both with the kind of large earth station now used with the Intelsat system and with special, middle-sized earth stations for transmission and reception.

Organisations

For the Symphonie project, special consortia have been created in France and Germany.

Documentation:

Pfeiffer, B. and Viellard, P. :
The Telecommunications Satellite Project Symphonie.
Paper presented at the meeting on "Communication Satellites", British Interplanetary Society, Southampton, 19 and 20 September, 1972.

Sueur, R. :
Le Project Symphonie et ses Applications
4eme Conference Etats-Unis/Europe d'Eurospace, Venise 22-25 Septembre, 1970.

3. Advanced Satellite Systems, in particular broadcast satellite systems

3.1. General

Plans for experiments in the use of advanced satellite systems, in particular for direct broadcasting, or for the establishment of such systems have advanced in many parts of the world. In most cases, the purposes of such systems are for educational television programmin

Documentation :

Burke, Joseph :
Experimental systems in applications technology satellite (ATS F&G)
AIAA 4th Communications Satellite Systems Conference. American Institute of Aeronautics and

Astronautics, Washington D.C., April 24-26, 1972.

Dill, Richard :
Kommunikations-Satelliten in der Bildugsplanung
in Internationales Jahrbuch der Erwachsenenbildung. Quelle and Meyer, Heidelberg 1971.

Jamison, Dean :
Optimal Utilization of Communication Satellites for Educational Purposes.
AIAA 2nd Communications Satellite Systems Conference. San Francisco, California, April 8-10 1968.

Knopow, J.J. :
Next generation communications satellites.
AIAA 4th Communications Satellite Systems Conference American Institute of Aeronautics and Astronautics. Washington D.C., April 24-26 1972.

Les Satellites d'Education; Colloque International, Nice, 3-7 Mai, 1971.
Centre National d'Etudes Spatiales, Paris, 1971.

Morgan, Robert P. and Singh, Jai P. :
A Guide to the Literature on Application of Communications Satellites to Educational Developme
ERIC Clearinghouse on Educational Media and Technology. Stanford University, California, April, 1972.

Rostow, Eugene V. ed:
Satellite Communications and Educational Television in Less Developed Countries.
Staff Paper three, President's Task Force on Communications Policy, US Department of Commerce. Washington D.C. June 1969.

Schramm, Wilbur and Platt, William J. :
Satellite-Distributed Educational Television for Developing Countries - Summary Report.
Prepared for Agency for International Development. Washington D.C. August 1968.

Schramm, Wilbut :
Communication Satellites forEducation, Science and Culture.
UNESCO, Paris 1968, (Reports and Papers on Mass Communication No. 53)

3.2. USA

The first experiments in the use of this technology will take place in the United States. The experimental NASA Satellite ATS-F which is due to be launched in 1974, will be used for television experiments in the Rocky Mountain States. The Apalachian region and Alaska. These transmissions are intended for educational purposes and the experiments will be carried out for a period of about nine months.

Organisations:

National Aeronautical and Space Administration (NASA)
Washington D.C.

Documentation :

Morgan, R.P., Singh, J., Anderson, B., and Greenburg, E. :
Satellites for US Educational needs: Opportunities and Systems.
AIAA 4th Communications Satellite Systems Conference. Washington D.C. April 24-26 1972.
American Institute of Aeronautics and Astronautics, New York.

3.3. India

After the experiments in the U.S.A., The ATS-F will be moved to a position over the Indian Ocean. In accordance with the agreement concluded in 1969 between the Indian Department of

Atomic Energy and the US National Aeronautics and Space Administration, the satellite will be used for the Satellite Instructional Television Experiment (SITE) for about a year. SITE will broadcast programmes to about 5,000 selected villages of which about 3,ooo will receive the signal through rebroadcasts by regular television transmitters and about 2,000 for direct viewing on community receivers.

The Indian authorities will be completely responsible for the earth segment and programming. The general objectives of the experiment are to gain experience in the development and management of a satellite-based instructional television system, to demonstrate of effective mass communications in a developing country and in the practical instruction of village inhabitant, and to stimulate development in India.

The primary instructional objectives are to contribute to family planning programmes, to improve agricultural practices and to contribute to national integration. The secondary instructional objectives include school and adult education, teacher and vocational training.

Plans have been announced for an operational Indian satellite system (INSAT)

Organisations

Indian Space Research Organisation (ISRO), Space Applications Centre, Ahmedabad 380015, Mr. E.V. Chitnis, Programme Manager, SITE, (Responsible for technical aspects)

ISRO:

Audiovisual Instructional Department
52 Jor Bagh, New Delhi 3, (Responsible for part of programme aspect)

All India Radio
Broadcasting House, Parliament Street, New Delhi 1.
(Major responsibility for programme aspect).

Documentation :

Chitnis, E.V. :
Satellite Instructional Television Experiment (SITE)
Indian Space Research Organisation, Ahmedabad, 1970.

Menon, M.G.K. :
INSAT in Perspective.
AIAA 4th Communications Satellite Systems Conference. American Institute of Aeronautics and Astronautics, Washington D.C. April 24-26 1972.

UNESCO:
Preparatory study of a pilot project in the use of satellite communications for national development purposes in India.
Report by Unesco expert mission (N. Gadadhar, R.B. Hudson, R. Lefranc, E.W. Ploman and N.L. Tchistiakov) Unesco document COM/WS/51, 5 February, 1968.

United Nations Committee on Peaceful Uses of Outer Space.

India/United States.
Experimental Satellite Project Memorandum of Understanding between the Department of Atomic Energy of the Government of India and the United States National Aeronautics and Space Administration. UN document, A/AC. 105/72. 11 December, 1968.

3.4. Brazil

The Brazilian educational satellite programme, known under the title Satellite Avancado de Comunicações Interdisciplinares (SACI) is designed to apply the systems approach to the

possible use of a geostationary satellite to improve the capability of the educational system and to provide a number of communication services.

In the first phase which started in January 1972, experiments are carried out between the University of Stanford and the Instituto Nacional de Pesquisas Espaciais at São José dos Campos. During the second phase, the intention is to demonstrate the advantages of communications systems based on both terrestrial and space techniques. A comprehensive educational experiment will be undertaken in Rio Grande del Norte. The third phase envisages the use of a Brazilian-owned satellite for education and communication purposes.

Organisations

Instituto Nacional de Pesquisas Espaciais,
São José dos Campos, São Paulo.

Documentation:

De Mendonça, Fernando and staff:
Educational Television via Satellite, Brazilian Case, Project SACI,
Presented at Conference on the Use of Satellites for Educational Purposes in Developing Countri
München, 12 October 1972.

Lopes, Onofre:
Novas técnicas educativas através dos satélites;
Universidade Federal do Rio Grande do Norte, Natal 1968.

Unesco
Preparatory study of the use of satellite communication for education and national development in Brazil.
Report by a Unesco expert mission (N. Gadadhar, R. Hudson, E.W. Ploman). 21 October, 196

3.5. Canada

In April 1971, the Canadian Department of Communications, in co-operation with NASA launched an experimental project entitled "Communications Technology Satellite" (CTS). The objective of the CTS project is to investigate the operation of a high-power reactor satellite to provide two-way voice communications to remote areas in Canada.

Documentation:

Department of Communications, Communications Technology Satellite
Press Release, Ottawa, 20th April 1971.

3.6. South America

Following a number of preliminary investigations, a feasibility study financed by the UNDP and carried out by Unesco and ITU is currently being conducted in South America on a regional system for education, culture and development information: the countries participating in this study are Argentina, Bolivia, Chile, Colombia, Ecuador, Paraguay, Peru, Uruguay and Venezuela.

The basic concept envisages a regional organisation established by the Spanish speaking countrie in the area which would be responsible for the development and operation of a regional system using various communication media, including broadcast satellites, to distribute educational and cultural programmes to approximately 20 million students of all grades and about 15

million adults in 150,000 receiving centres equipped with some 600,000 television receivers.

Documentation :

Ministerio de Cultura y Educacion/Programa de Naciones Unidas para el Desarolla/UNESCO.
Seminario Preparatorio sobre un Estudio de Factibilidad de un Sistema Regional de Teleducació
Buenos Aires, 17-21 December.

Page Communications Engineers, Inc.,
Final Report New Communications Technologies for Less Developed Countries, Vol I and II,
Prepared for the President's Task Force on Communications Policy.
Page Communications Engineers. Washington D.C. 31March 1969.

Platt, William J., et al :
Satellite - Distributed Educational Television for Developing Countries - the case of Latin America; prepared for Agency for International Development, Washington D.C. August 1968.

Torfs, Jacques :
Satellites : South America.
International Broadcast Institute Newsletter No. 6, London Summer, 1972.

UNESCO:

Preparatory study of the Use of Satellite Communication for Education and National Development by E.W. Ploman, W.B. Pierce and J. Torfs.
Unesco doc. 1903/BMS. RD/Com. Paris, May 1970.

.7. Arab States

Preliminary investigations have been undertaken in the Arab region, by regional organisations, as well as by international organisations. The results of these studies have tended to confirm the potential advantages of satellite communications, both for the provision of communications among the countries in the region and for the broadcasting of television programmes for community reception according to the educational and information requirements of individual countries.

Organisations :

League of Arab States
Tahlir Square, Cairo, A.R. Egypt.

Arab States Broadcasting Union
23 Kasr el-Nil, Cairo, A.R. Egypt.

Documentation :

Arab States Broadcasting Union
The project of launching an Arab Satellite
The First Arab Conference on Space Communications. Amman, 23-26 September 1972.

Labib, Saad:
The possibilities of using Satellite Communications for Education and National Development in the Arab States.
The First Arab Conference on Space Communications. Amman, 23-26 September 1972.

Unesco:
The Use of Satellit Communications for Education and National Development, by E.W. Ploman, A. Berrada, B. Clergerie.

Unesco Document No. 2372/RHS. RS/FF. Paris, March 1971.

3.8. Other Studies and Plans

3.8.1. Africa

The French Space Research Centre (CNES) in co-operation with a certain number of countries in French-speaking African countries has undertaken studies for the use of Symphonie satellites for transmission of educational television programmes (project Socrate).

Unesco has recently carried out preliminary studies for use of satellite communications for education and national development in Sub-Saharan Africa.

Documentation :

Baer, J. and Kuhn G. :
De meilleures telecommunications pout l'Afrique.
Journal des Telecommunications, Vol. 32, No. 9. 1965.

Socrate : Television Educative en Afrique.
Etude comparative entre un systeme a satellite d'education et des chaines de television educative nationale.
Centre National d'Etudes Spaciales/Office de Radiodiffusion Television Francaise.
Paris, Re-edition Septembre 1971.

Unesco :
"Les pays d'Afrique au Sud du Sahara".
Etude préliminaire d'un système régionale de satellite pour l'éducation, la culture et le développement. Ser. No. 2869 RMO. RDFDC. Paris, March 1973.

3.8.2. Asia :

Some preliminary studies have been made both for national use (Iran, Indonesia) and for regional use (South-East Asia).

3.8.3. Europe:

In Western Europe, proposals have been put forward for various kinds of satellite broadcast systems, nationally (F.R. of Germany, UK) and regionally,(ESRO).

Documentation:

Projet de satellite allemand de radiodiffusion et de television
Journal des Telecommunications Vol. 39 - X/1972.

Schendel, A.H. and Bodemann, F.W. :
Fernsehdirektempfang über Satelliten.
Vortrag am 5.10.72 anlässlich der 5. DGLR - Jahrestagung, Berlin.

4. International organisations

4.1. Intergovernmental

4.1.1. United Nations:

United Nations activities with regard to satellite communication are carried out through the following bodies:

a) The Committee on the Peaceful Uses of Outer Space and its subsidiary bodies, the Scientific

and Technical Sub-committee, the Legal Sub-committee and the Working Group on Direct Broadcast Satellites.

In the scientific and technical fields, the Committee works for exchange of information, encouragement of international programmes, especially with regard to space applications. In the legal field, the work of the committee has resulted in the Outer Space Treaty of 1967* and two subsequent international instruments on rescue of astronauts and international liability for damage caused by space objects.

*Full title: Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and other Celestial Bodies.

b) United Nations Secretariat, mainly through
-the Outer Space Affairs Division, which provides the technical services for the Outer Space Committee and its bodies and shall act as a focal point for international co-operation in the peaceful uses of outer space

- the Office for Science and Technology and the Advisory Committee on the Application of Science and Technology to Development

c) United Nations Development Programme (UNDP) ; UNDP projects concern point-to-point communications via satellites and development of broadcasting by satellite.

Of particular interest in this context is the Working Group on Direct Broadcast Satellites set up by the Outer Space Committee, according to a General Assembly resolution of 1968. This Group was requested to study the technical feasibility of satellite broadcasting, the current and foreseeable developments in this field, as well as implications in the social, cultural, legal and other areas.

The Group held three sessions in 1969 and 1970. Its findings were endorsed by the parent Committee and by the General Assembly in a resolution of 1970.

Following the action taken by the ITU, Unesco and other bodies and following the proposal by the USSR for the adoption of a convention on legal principles to govern satellite broadcasting, the Group was re-convened in 1973. It was decided that the Group should continue its work particularly with regard to political and legal problems and the elaboration of principles on the use of satellites for direct television broadcasting.

Documentation :

a) Resolutions adopted by the General Assembly dealing particularly with satellite communicatio

1378 (XII)	13 December	1958
1472 (XIV)	12 December	1959
1721 (XVI)	20 December	1961
1802 (XVII)	14 December	1962
1902 (XVIII); 1963 (XVIII)	13 December	
2130 (XX)	21 December	1965
2222 (XXI) ; 2223 (XXI)	19 December	1966
2260 (XXII) ; 2261 (XXII)	3 November	1967
2453 (XXIII)	20 December	1968
2600 (XXIV) ; 2601 (XXIV)	16 December	1969
2733 (XXV)	16 December	1970
2776 (XXVI) ; 2778 (XXVI)		
2915 (XXVIII) ;	14 December	1971
2916 (XXVIII) ; 2917 (XXVIII)	14-15 November	1972

Working Group on Direct Broadcast Satellites

First Session : (11-22 February 1969)

Report : doc. A/AC. 105/51
Working Papers: Canada-Sweden, Doc. A/AC. 105/49. United States - doc. A/AC. 105/50
ITU - doc. A/AC. 105/52

Second Session : (28 July - 7 August 1969)

Report : doc. A/AC. 105/66
Working Papers : Argentina - doc. A/AC. 105/WG3/WP1. Australia - doc. A/AC. 105/63
Canada-Sweden - doc. A/AC. 105/59. Czechoslovakia - doc. A/AC. 105/61.
France - doc. A/AC. 105/62. Mexico - doc. A/AC. 105/64. United Kingdom - doc. A/AC. 105/
Unesco - doc. A/AC. 105/60

Third Session: (11-21 May 1970)

Report : doc. A/AC. 105/83
Working Papers : Canada-Sweden - doc. A/AC. 105/WG.3/LI. USSR - doc. A/AC. 105/WG.3/CR
UN - doc. A/AC. 105/79

Fourth Session : (11-22 June 1973)

Report : doc. A/AC. 105/117
Working Papers : Canada-Sweden - doc A/AC. 105/WG./L.4. U.S.A. - doc. A/AC. 105/L.71
Unesco - doc. A/AC. 105/WG.3/L.5

4.1.2. International Telecommunication Union (ITU)

The ITU, as the UN specialized agency responsible for telecommunication matters, has a number of vital functions with regard to satellite communications. The most important are: allocation of radio frequencies, elaboration of technical criteria, formulation of regulatory procedures concerning the use of frequencies and their registration, planning of space radiocommunications. To this should be added ITU activities as executive agency for technical development projects in the space communication field.

With regard to satellite communication, the most important action taken by ITU has been through

- The Extraordinary Administrative Radio Conference 1963

- The World Administrative Radio Conference for Space Telecommunications, Geneva, 1971 (WARC-ST); the frequency plans, co-ordingating procedures and other systems, including satellite broadcast systems, adopted by this conference are those now in force.

Documentation :

Final Acts, World Administrative Radio Conference for Space Telecommunications, Geneva, 197

Final Acts, Extraordinary Administrative Radio Conference to Allocate Frequency Bands for Space-Radio Communication Purposes, Geneva, 1963.

Telecommunication Journal, in particular: Space Special, Vol. 35, No. VIII - August 1968.
Space Special, Vol. 38, No. V - May 1971.

ITU Booklets

No. 2 ITU and space radiocommunication, 1968.
No. 3 Eighth report by th ITU on telecommunication and the peaceful uses of outer space, 1969.
No. 4 Symposium "Space and radiocommunication", Paris 1969
No. 6 Ninth Report by the ITU on telecommunication and the peaceful uses of outer space, 1970.
No. 8 Tenth report by the ITU on telecommunication and the peaceful uses of outer space, 1971.
No. 9 Speeches made at the inaugural meeting of the second World Administrative Radio Conference for Space Telecommunications on 7th June, 1971.
No. 10 Eleventh report by the ITU on telecommunication and the peaceful uses of outer space, 1972.
No. 11 Twelfth report by the ITU on telecommunication and the peaceful uses of outer space, 19

.1.3. Unesco

Unesco's programme in the space communication field is based on its mandate to further the development of information media for the promotion of education, science and culture, to which later has been added national development generally. Relevant in this respect is also Unesco's programme to encourage international co-operation in the forecasting of social changes following the introduction of new scientific and technological methods.

This work has mainly been carried out through a series of meetings specifically devoted to various aspects of satellite communications and through expert missions which at the request of the concerned governments have studied the feasibility of using satellite systems for education and national development.

In 1972, the Unesco General Conference adopted a Declaration of Guiding Principles on the Use of Satellite Broadcasting for the Free Flow of Information, the Spread of Education and Greater Cultural Exchange.

Documentation:

1. Reports of Meetings

Meeting of Experts on the use of space communication for the mass media.
Paris, 1965, Report Doc. MC/52
Meeting of Experts on the use of space communication for broadcasting
Paris, 1968, Report Doc. COM/CS/68/1/7.
Meeting of Experts on International professional arrangements for space broadcasting.
Paris, 1971, Report Doc. COM/71/CONF 5/7.

2. Other Documentation

An annotated Bibliography of UNESCO Publications and Documents dealing with Space Communication, 1953 - 1970. Paris, 1971.

Gjesdal, Tor :
UNESCO's Programme in Space Communication. Unesco Chronicle, Vol. XVI, No. 11, November, 1970.

Ploman, Edward W. :
A guide to Satellite Communication. Reports and Papers on Mass Communications No. 66. UNESCO, Paris, 1972.

Schramm, Wilbur :
Communication Satellites for Education, Science and Culture. Reports and Papers on Mass Communication, No. 53. UNESCO, Paris, 1968.

UNESCO:

Broadcasting from Space, Meeting of Governmental Experts on International Arrangements in the Space Communication Field, December 1968.

UNESCO:

Communication in the Space Age; The Use of Satellites by the Mass Media. Paris 1968.

III CABLE TELEVISION AND BROADBAND NETWORKS

Introduction

Compared to satellite communications, activities related to cable television and broadband networks are typically national in character.

The general situation is dynamic and fast-changing. Information on the cable situation therefore rapidly becomes obsolete. Since this technology has so far been used mainly in a local context, the information given will concentrate on certain major aspects and significant new uses.

Cable systems are at present being developed or introduced in the industrialized countries, but economic, technological and other reasons have so far limited their use in developing countries. Development of cable systems is pronounced in North America, but is growing also in other areas, particularly Japan and certain Western European countries.

Background

1. General

There are now two main types of cable distribution systems representing a difference of approach which arose for historical reasons.

In the early 1930's, particularly in the United Kingdom, a substantial business developed in the wired relay of sound radio programmes. This business developed mainly in the wired relay of sound radio programmes. This business developed mainly in large provincial cities, e.g. Hull, Leeds, Newcastle, Nottingham, Bristol and Portsmouth. The total number of subscribers reached about 1 million in 1950.

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1) The distribution of television signals through wire rather than over the air first became known as "community antenna television" or CATV. This expression has gradually been supplanted by the term "cable television". It has been argued that in order to take current and foreseen developments into account, more adequate expression would be "cable communication", "cable systems" or "broadband networks".

The cost of the cable connection, programme switch and loudspeaker was competitive with the radio receivers of the day and this, together with the convenience and reliability of the system, provided the economic base for its growth. With the large scale growth of television in the early 1950's, it became necessary for the relay operators, if they were to stay in business, to develop television distribution methods which would, as with sound radio, be competitive with direct reception off-air in the generally good reception conditions of the large provincial cities. The result was the so-called multi-pair system which can serve simplified receivers directly, or conventional off-air receivers through an "inverter". Since the programmes are carried on physically separate channels these systems may be described as space division multiplex.

The other type of system was developed, principally in the USA, for different reasons. Efforts to develop alternative methods for distribution of TV signals were caused by a number of factors such as reception difficulties due to geographical conditions or urban development and the lack of adequate television coverage in economically weak areas. This led to the development of cable systems which were intended for the improvement of reception of weak or non-available signals from distant stations and with the provision of more programmes than available locally. The most suitable system for this purpose uses a single coaxial cable to which standard television receivers can be directly connected. The different programmes are carried on different

frequency channels in a manner analogous to over-the-air broadcasting, this method is generally referred to as frequency division multiplex.

A further reason for the introduction of cable distribution is the limitation of frequencies available for television. This factor is particularly pronounced in Europe where the frequencies allocated in the Stockholm plan of 1961 in general permit a maximum of four national television programmes, in certain cases even less.

Originally, cable systems were only used to redistribute radio and television programmes. The advantages of cable systems were seen as
- better reception
- possibility of increasing the number of programmes available to the subscriber
- liberating frequency bands for other uses, in particular for the mobile services that are completely dependent on over-the-air transmission
- avoidance of "antenna forests"

The present interest in cable systems does however not depend only on a capacity of providing an extension of existing services. The importance of cable communication lies in the possibility of providing new services. These will be noted below.

1.2. Functioning and Main Elements of a Cable System

A typical cable system for redistribution of television signal functions as follows:

Signal from television transmitters are picked up by special antennas placed on a hilltop or some other favourable location. A cable brings the signals to a "head-end" where they are amplified and fed onto the cable distribution system.

The distribution system consists of trunk cables extending from the "head-end", "feeder" cables branching out along streets and "drop" cables running from the feeder line into the homes of the subscribers. The cables may be strung on overhead poles or buried in underground ducts.

Currently used systems may be classified in two main categories:

a) systems in which the totality of programmes are distributed to the consumer.
The majority of existing systems are of this kind and use either coaxial cables or hf multipair wires. In the former case a large number of channels may be provided, (most systems offer between 12 -24 channels but present capacity goes up to 60 channels), in the latter cases reception is limited to 5 radio programmes, and 6 television programmes.

b) systems in which one programme is distributed on request to the consumer. In such a system the subscriber receives only one programme which he requests from a switching centre with the help of a telephone dial. The British firm, Rediffusion, has developed the "Dial-a-programme" system which can offer a choice of up to 36 programmes with the use of a simplified receiver. The similar American system, "Discade", offers a choice of up to 24 channels.

Each of these systems presents a certain technical and economic advantage and disadvantage. So far, the coaxial cable systems are those mostly used, except in the UK.

1.3. Economic Aspects

Both investment costs and subscriber costs vary from country to country.

According to an American study 1), based on the analysis of various cases, the following general points have been made:
- a capital investment of roughly $100 per household, or $200 per subscriber with 50% saturation, will be required for a 20-channel cable system with minimum two-way capability in a major metropolitan area
- most of the capital investment goes for equipment and facilities shared by the subscribers; thus capital costs on a per subscriber basis decrease significantly with increasing saturation.

- capital costs are sensitive to household density and the amount of underground construction required.

In Europe the entire installation cost for a small network is about $320.000.

Subscriber costs also vary. In the United States installation fees averages $20 with an average monthly fee of $5. A typical European figure is approximately £5 in annual fees as applied in such countries as Belgium and the UK.

1.4. Future Developments

1.4.1. Interconnection

So far, cable systems have been mainly established and used in and for local communities (whether in a building complex, housing development, small town or sectors of metropolitan areas.)

One of the major developments foreseen in the near future is the interconnection of cable systems, either on a temporary or regular basis. The technology for such interconnection is known:

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1) Walter S. Baer: Cable Television : A Handbook for Decision-Making, Rand Corporation, February 1973, R-113, WSF

a) for link-ups on a more limited scale various terrestrial means may be used (high capacity micro-wave systems, wave-guide systems or, somewhat later, laser systems)
b) interconnection over large areas can be achieved through the use of satellite systems. One such system has already been proposed in the United States and approved by the Federal Communications Commission (Hughes Aircraft proposal for US domestic satellite system)

1.4.2. Two-way Facilities

Future new services and communication pattern would depend even more on the provision of facilities for return communication from the subscriber. This would transform what has until now been one-way distribution system into a two-way communication system (see below).

1.4.3. Combinations of Communications Techniques

In general terms, a great number of new communication services will become possible through combinations of different now separately used communication techniques and services. According to many observers, cable technology and cable systems will be a key factor in this respect.

As examples may be mentioned:
- the use of the television receiver as a display unit for transmission of textual information, in the form of teleprinter output
- on-going efforts to develop a viable system that combines television and facsimile techniques so as to make possible electronic instead of physical transportation of printed, graphic or any other textual information, available in hard copy if so required by the subscriber
- the development of two-way facilities for subscriber response services and even more for on-request information retrieval depends on the combination of cable and computer technology.

2. Services Which May Be Provided Through Cable Systems

2.1. Distribution: Extension of Present Services

In this case, the cable system functions as a unilateral distribution network for the distribution

of television and radio programmes made available through over-the-air broadcasting. This was the original use of cable television and is still the prevalent one, particularly in Europe. The increased number of channels available also makes it possible to extend more specialized programme services - education, social information, etc. - which to a limited degree are at present provided in over-the-air broadcasting. While it can be expected that such services will continue to be provided by the existing broadcasting organisations, there would be possibilities for distribution of material produced by other institutions.

2.2. Distribution : New Services

One of the major innovations made possible by cable systems is the provision at the local level of services which generally are not available through conventional broadcasting. Particular attention has been given to local programming of various kinds, public access channels and specialized services. With the exception of certain experimental and limited activities in Europe and Japan, such new services over cable systems have mainly been provided in Canada and the United States.

2.2.1. Locally originated Programming

In both Canada and the US current regulation encourages local programme origination. It is estimated that in 1972 slightly more than 20% of the cable systems in the US originated programmes other than the automated services. Such local programming includes local news, events and sports, advertising, interviews and discussions, church services and movies. In Canada, 114 of the 361 cable systems undertake regular local programming.

As examples of locally originated services may be mentioned:

a) Local government, municipal services
Typical current applications of local government services over cable systems include:
- in Liberal, Kansas and "Emergency Alert" cable channel is used to report tornado warnings, lost children and other emergencies; a tone generator on other channels notifies viewers when an announcement will be made
- in Palm Desert, California, a cable system produces programmes for Chicano migrant workers on maternal and child health care, job opportunities, social welfare and other government services available to them
- in Casper, Wyoming, the public library provides a "Video Reference Service" on Cable Television subscribers ask questions via telephone and a librarian answers via a cable channel.

Among the potential uses for the local government channel have been mentioned: applications for law enforcement, fire prevention, emergency services, criminal justice administration, employment services, consumer protection, environmental monitoring and control, health care, public library services, social services, municipal, cultural and recreational events, local government administration, community involvement in local issues.

Suggestions have also been made in the US for the setting up of "community information centres": a city would provide some programming on the local government channel toward groups assemble at existing neighbourhood facilities.

b) Educational services
At present, examples of educational uses of channels on cable systems include:
- public schools in Willinboro, New Jersey use cable television to transmit reading readiness programmes for pre-school children; the programmes are watched in nursery schools, at the public library and in homes
- In Corvallis, Oregon, the Oregon State University transmits college-credit courses to off-campus students
- in Monroe, Louisiana, the cable television system links up with the Louisiana Hospital Television Network to distribute continuing medical education directly to doctors' homes and offices on a special channel.

coincide with educational services envisaged for regular, over-the-air television with the difference that educational services over cable would be able to take advantage of the great channel capacity, of the possibility of providing channels for audience selection and eventually two-way interaction between viewer and programming source.

The educational services envisaged include instructional programmes to schools, out-of-school education such as career education, high school and post-secondary degree courses in the home, instruction for homebound and institutionalised persons, pre-school education and general education.

.2.2. Public Access

In the United States public access channels have been defined as those channels set aside by the cable operator for direct use by the public, with no control exercised over programme content other than that imposed by general libel and profanity laws.

The FCC requires the cable operator to establish rules for the public access channel which at a minimum contain these provisions:
- public access must be on a free first-come, non-discriminatory basis
- advertising is prohibited for commercial products or services, or on behalf of any candidate for public office
- lotteries and obscene or indecent matters are prohibited
- facilities for live studio presentation of five minutes or less must be provided free of charge. Charges for programmes of more than five minutes, and other fees, "must be consistent with the goal of affording the public a low cost mean of television access"
- public inspection of the names and addresses of all persons or groups requesting access time must be permitted. The operator must retain such records for two years.

In Canada, the expression, "community programming", is used for programmes which are initiated by community groups or individuals. According to an investigation made by the Canadian Radio-Television Commission on such community programming, the community people involved in the production is as follows:

Individuals	19%
Public Service Groups (Red Cross, YMCA, etc)	16%
Community Information Groups	14%
Arts/Crafts froups focused on music, culture, etc.	13%
Social action or hobby groups with specialised interests (welfare rights, consumer protection, legal questions, etc.)	13%
Ethnic groups	7%
Other groups	16%
	100%

The use of cable systems as a medium for participation and involvement by individuals and groups was to a large extent conditioned by the availability of the new, cheap and easy to use production technology, in particular half-inch video-tape.

The use of half-inch videotape as an alternative to the mass communications systems was developed several years ago, particularly by so-called "underground" video-groups (such as Open Channel, Global Village, Raindance in New York, see below)

.3. Two-way services

Most of the above-mentioned services are still basically one-way services, even if of a much more diversified nature than those presently available. A further and more basic change is heralded by the introduction of two-way or interactive services have been proposed or

envisaged, ranging from the trivial to new political patterns. [1]

The proposed services differ markedly in design and cost depending on whether they are initiated and controlled by the system itself or by the user.

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1) see enumeration in Walter S. Baer: Interactive Television, Prospects for Two-Way Services on Cable; Rand Corporation, R-888 MF, November 1971.

2.3.1. System-initiated two-way services

Typical examples of such services would be audience counting, meter reading, alarm detection, opinion polls, participation in quizz games, response to questions in educational programmes. In such cases, replies can be sent by pushing a button or automatically. They would therefore only require relatively low information or what has been termed narrowband responses and a relatively inexpensive subscriber terminals estimated to cost up to $300 with a drop to $100-2[illegible] if mass produced. [1]

The limitation to feed-back only through data transmission might not be acceptable for certain other services such as educational programming, medical diagnosis in the home, community information services. In this case, response in voice and even video might be required. Particularly voice response has already been used for televised instructional courses (Stanford University and others). Experience has already shown that return cable (or microwave) voice channels have advantages in terms of connection speed and convenience compared with return telephone circuits.

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1) The costs quoted here and in the following sections have been taken from Walter S. Baer : Interactive Television, Prospects for Two-Way Services on Cable, Rand Corporation, R-888 MF November 1971

The cost for the subscriber equipment (microphone, speaker, modulatro etc.) has been estimated at $50-100 above the simple data response unit. This cost is expected to drop by a factor of two for larger quantities. Equipment for video response would be more expensive, i.e. an estimated $1.500 at each location for black and white.

2.3.2. Subscriber-initiated two-way services

The choice of available services would be much greater with, if the subscriber were not restricted to answering questions or responding to items represented to him but could request information or entertainment at his convenience. Subscribers could use a push-button device or a full key-board. The requests would be processed by a head-end computer which would serve as a switching centre between the consumer and the information source.

For simple requests, such as train, plane and bus schedules, stock prices, information on location of public health and other services, the subscriber terminal could be in the form of a small strip printer. (cost estimated at less than $100).

For display on the television receiver a single picture would be sent to the subscriber who would need equipment for recording and display of still pictures. Such "frame stopping" and "frame storage" devices are still in a very early development stage. [1]

Even if the cost of videotape recorders would drop substantially, it is not sure if and when individual households can be expected to be so equipped.

These services link the subscriber to the headend of a cable system. A further development would be to provide facilities for subscribers to communicate directly with one another, similarly to a telephone system. It is thought that a cable system can be readily adapted for message and data transmission.

1) The first public demonstration of a frame stopping equipment was shown by MITRE corporation in Roston, Virginia, for use in a computer aided instruction project via cable.

The subscriber terminal would be similar to the one for polled, narrowband responses with the addition of a keyboard teleprinter, and other additional equipment. The cost for an inexpensive terminal has been estimated to between 800 and 1000 dollars.
For such point-to-point services requiring voice and video, one method suggested is to assign special frequencies or to use separate cables for such services. It is foreseen that in the first instance municipal authorities, (police departments), school systems and business enterprises would be interested in these services. The cost of the subscriber terminal would depend on the specific use required; a medium quality video terminal with black and white camera and associated equipment has been estimated to $2.500 -3.500. These latter services would in a switched network roughly correspond to the videophone.

3. Organisations and documentation: USA, Canada

3.1. U.S.A.

3.1.1. Organisations

a) Federal Agencies

Federal Communications Commission
1919 M. Street, N.W., Washington D.C. 20544

The FCC's jurisdiction over cable systems as part of its mandate under the Communications Act was affirmed by the Supreme Court in 1968.

In 1970, the Commission created a special Cable Television Bureau responsible for administering and enforcing cable TV rules, gathering information about the cable industry and advising the Commission on cable matters generally.

b) Private Organisations and Associations

National Cable Television Association Inc.,
918-916th Street, N.W., Suite 800, Washington D.C. 2006.

NCTA was established in 1952 as a national tradeorganisation representing the CATV industry before the Federal Communications Commission and state regulatory bodies. Included in its active membership are 1150 operating CATV systems and 210 associate members. Associate members are manufacturers and suppliers of CATV components. CATV brokerage and consulting firms, financial and other organisations having an interest in the CATV industry.

Cable Television Information Center

2100 M. Street N.W. Washington D.C. 20087
Provides information primarily to local government officials. However, the Center's reports are available to all.

United Church of Christ
Office of Communication
189 Park Avenue South, New York, N.Y. 10010

A leading force in support of citizen involvement in cable television.

Publicable
National Education Association
1201-16th Street, N.W., Washington D.C. 20086
Acting Director: Dr. Harold E. Wigren.

"Publicable" was published in July 1971 in an attempt to stimulate public interest in cable television. The organisation seeks to identify issues in cable communication and provide information and assistance to varied public interest groups. "Publicable" is represented

Institute of Film and Television

New York University School of the Arts
Director: George Stoney.

South Building, 51 West 4th Street, New York, N.Y.
The institute runs the following projects:

NYU Media Club, a community film project, producing video tapes covering all subjects and shown daily

Videotex, a community video access centre. A model for the development of community video centres. Over 100 people were trained in four months.

Alternate Media Center, established as a prototype for the development of local origination programs for CATV.

3.1.2. Documentation :

Center for Analysis of Public Issues
Public Access Channels: The New York Experience. March 1972, 27 pp. plus Appendix. Available from the Fund for the City of New York, 1133 Avenue of the Americas, Suite 2290, New York, New York 10036.

Committee of Telecommunications

Communications Technology for Urban Improvement.
National Academy of Engineering, Washington D.C. 1971, 218pp.

A description of more than 20 possible pilot projects - most involving cable - to demonstrate public uses of telecommunications. Available as Publication No. PB317 from the National Technical Information Service, U.S. Department of Commerce, Springfield, Virginia 22151.

Heitler, Bruce and Kalbe, Kas (eds.)
The Cable Fable
Yale Preview of Law and Social Action, Vol. 2, No. 3, Spring 1972, 106pp ($1.00)

Described by the editors as a "counter source of views" to the Sloan Commission Report, this issue emphasises the problems posed by the commercial cable development. Available from Yale Law School, Box 87, New Haven, Connecticut 06520.

LeDuc, Don R., "A Selective Bibligraphy on the Evolution of CATV, 1950-1970"
Journal of Broadcasting, Vol. 15 No. 2, Spring 1971.

Molenda, Michael
Annotated Bibliography on the Educational Implications of Cable Television. North Carolina University, Greensboro, School of Education, Publ. date. Jan. 1972.
Brief annotations are provided to material on the educational implications of Cable Television (CATV). The material covered consists of articles, position papers, conference proceedings, government statements and legal documents, published between 1967 and 1971. The material is divided into four sections: status and status future of CATV; regulation of CATV; CATV and education; and CATV and socio-cultural concerns.

Price, Monroe and Wicklein, John
Cable TV: A Guide for Citizen Action, Pilgrim Press, Philadelphia, 1972, 220pp ($2.95).
Presents a persuasive case for citizen involvement in local decision-making. Copies are available from the Office Communications, United Church of Christ.

Philips, Mary Alice Mayer:
CATV: a history of community antenna television.
Northwestern University Press, Evanston, Illinois, 1972.

The development of community antenna television (CATV) is traced from its beginnins in various local efforts to bring television to areas of poor reception. The history of federal, state and municipal regulatory practices and problems are examined, and the potential applications of cable television are discussed in some detail.

Sloan Commission on Cable Communications

On the Cable, the Television of Abundance, McGraw-Hill, New York 1971, 256pp ($2.95). The product of a year-long study, the Sloan Commission report contains excellent background material. The report surveys the history and technology of cable television and suggests the prospects and possibilities. Available in commercial bookstores.

Smith, Ralph Lee, The Wired Nation, Harper & Row, New York, 1972, 128pp ($1.95) Originally published in shorter from in The Nation, May 18, 1970, this still is regarded as one of the best introductions to cable television. Available commercially.

Schlafly, Hubert, Jr.
The real world of technological evolution in broadband communications. 1971, available free from TelePrompter Corporation, 50 W. 44th Street, New York, N.Y. 10036.

Stroud, William.
Selected Bibliography on Telecommunications (Cable Systems) May 1972, 38pp ($1.50) Quite comprehensive. Available from the Wisconsin Library Association. 201 W. Miffin Street, Madison, Wisconsin

Rand Corporation, under grants from the John and Mary Markle Foundation, and the Ford Foundation has undertaken a number of studies on cable television.

.2. Canada

.2.1. Organisations

a) Canadian Radio-Television Commission (CRTC)
The CRTC is the regulatory agency responsible for all broadcasting, including cable systems. TheCommission lays down the policy for cable television in Canada according to the provisions of the Broadcasting Act of 1968 and issues licences to cable operators following public hearings.
Chairman: Mr. Jean Pierre Juneau. V. Chairman: Mr. Harry Boyle
100 Metcalfe Street, Ottawa, Ontario K1A ON2

b) National Film Board
The National Film Board has taken an active part in various aspects of community programming as well as other new kinds of videoproduction.
Director: Sydney Newton
P.O. Box 6100, 3155 Côte de Liesse, Montreal 101, Quebec.

c) Canadian Cable Television Association
The Association represents a majority of CATV systems operating in Canada. President: R.C. Short
130 Albert Street. Ste. 908, Ottawa, Ontario.

2.2. Documentation :

Canadian Radio-Television Commission
Community Antenna Television, May 13, 1969.
The improvement and development of Canadian Broadcasting and extension of US Television Coverage in Canada by CATV, December 3, 1969.
Cable Television in Canada, January 1971.

The Integration of Cable Television in the Canadian Broadcasting System, 26 Feb. 1971.
Policy Statement on Cable Television, Summer 1972.
General and policy aspects have also been dealt with in various speeches given by various senior officials of the CRTC.

4. Activities in Europe

In most European countries, the regulation concerning telecommunications and broadcasting makes it necessary for cable operators to obtain authorisation from the competent authorities (in most cases Ministries of Post and Telecommunications). In general, cable systems have been used only for the distribution of programmes broadcast over the air, which in a number of countries has included the possibility of making foreign television programmes available. A case in point in Belgium where a number of systems provide their subscribers with ten programmes: the two Belgian programmes in Flemish and French, the two Dutch, the three German and the three French programmes.
At present, authorisation has recently been given in a number of countries for experiments in local programme origination.

a) United Kingdom

The decision to allow local programme production was announced by the Minister of Post and Telecommunications on 9th August, 1972. Five licences were awarded to the following companies:

Company	Location	Subscribers
Greenwich Cablevision	London	15.000
Rediffusion	Bristol	24.000
British Relay	Sheffield	31.000
Radio Rentals/EMI	Swindon	13.000
Wellingborough Traders Ass.	Wellingborough	8.000

So far, cable programming has been limited to material of strictly local interest without any specific requirements for educational or specialised services. Most experimental stations operate on the basis of a small studio, mobile 1 inch VTR and a staff of six.
The Cable Television Association which represents the main British operators has submitted a plan to the Ministry of Post and Telecommunications calling for an expansion of cable television, based on existing networks (Citizen's Channel, Video Arts Channel, Box-Office Channel, Local Television Channel, Leisure Studies Channel, etc.)

Documentation :
The Television Advisory Committee Report :
1972, and Papers of the Technical Sub-Committee,
Ministry of Posts and Telecommunications (Available at Her Majesty's Stationery Office)

b) Netherlands

Several adhoc experiments in local programme origination were undertaken until 24th December 1971 when a ministerial decree subjected such activities to authorisation.
In 1973, the Minister of Culture, Recreation and Society announced that six cable systems will be authorised to originate their own radio and television programming for an experimental period of two years; these systems are located in the following cities: Amsterdam/Bijlmer, Deventer, Dronten, Goirle, Melick and Herkenbosch, Zoetermeer. These experiments will be subsidised by the national government: all initial expenses for equipment, the total costs for programme production during the first year and 50% of the

production costs during the first six months of the second year.
The maximum time for locally originated programmes will be three and a half hours a week in radio and the same in television.

These local cable television organisations are being set up in the form of association of members who will themselves produce programmes, foundations some of which intend to provide professional production assistance.

Documentation:

Jacques J. Taks :
Cablecasting in an industrial society. The Blankenberg International Conference, 16-18 May, 1973.

c) France

The new broadcasting law of 1972 stipulates that the dissemination or distribution of programmes through whatever means is a national public radio and television service which is contrasted to the ORTF. Permission for programme distribution can however, under certain conditions, be given by ministerial decree.
In order to study all issues raised by cable television, the ORTF and the telecommunication administration have jointly set up two bodies
- Société Française de Télédistribution (SFT), which will undertake studies of all relevant economic, legal, etc. aspects.
- Centre Commun d'Etudes de Télévision et Télécommunications, which will exercise technical control of cable systems and study such new possible services as electronic distribution of newspapers.

It is foreseen to create local cable operating entities with participation from government or municipal authorities including the ORTF, local press, universities, cultural associations, private cable companies etc.

In principle, three channels should be reserved for the distribution of ORTF programmes, two-three channels for repeats of ORTF programmes. The local cable entities would be allowed to distribute foreign programmes and would otherwise be free to decide the composition of their programmes, subject to existing laws.

At present, it seems that after an experimental period of two years, a general cable statute will be elaborated. In July 1973, the government published a list of six cities for cable television experiments: Cergy-Pontoise, Chamonix, Créteil, Grénoble-Echirolles, Metz, Nice and Rennes.
In all those pilot projects, the cable system will be owned and operated by a company including Société Française de Télédistribution (34%). The local authorities and the regional press.
In the three most advanced projects it is foreseen to provide channels for local information (Cergy-Pontoise, Créteil), educational programmes (Grenoble) and a two-way service (Créteil).

Documentation :

Le Rapport Bujou, La Télédistribution, Sonovision, 8.3.1973.

d) Other European Countries

In a number of other countries, studies are under way concerning the role and function of cable systems, rules concerning local programming, etc.

IV. VIDEOGRAMS

1. Introduction

Since the first videocassette system was announced in 1968, expectations - and fears - were for a new revolution in audio-visual communication: after radio and television, the videocassette as a form of "individualised" electronic medium was to have a profound effect on the communications environments.

The expected revolution has not happened. It is still a potential. There is still much confusion mainly because a number of systems, whether technically ready or not, were announced or thrown 'on the market'. A number of different technical methods were used which made most systems incompatible: a cassette from one system could not be used with the player from another. The development of such videosystems had been initiated by electronic industries which vied with each other, with little attention paid to the potential consumer and his possible requirements.

The basic purpose of these new videosystems can be described quite simply: to provide a system in which a player is attached to the television receiver for individual replay of programmes recorded on cassettes or on discs.

The desirable characteristics of such systems may be listed as follows:
- optimal sound and picture quality
- capacity not only for replay of already recorded programmes, but also for recording broadcast television programmes or own productions.
- cassettes and discs should be able to provide adequate programme duration, at least 30 minutes, preferably up to 60 minutes
- the speed of replay should be flexible and the equipment should permit possibility of varying the speed, frame-stopping and possibility of playing back and forth
- the player should be simple, reliable, easy to maintain and operate
- the costs should be reasonable: the player should ideally cost less than a colour television set; the cassettes or discs with a recorded programme no more than a gramophone record or a book
- there should be technical compatibility so that cassettes or discs from one system can be used with a player from another system

The confusion also shows in the fact that there is no generally accepted term to cover all the different systems. Often the term "videocassette" is used so as to include also video-discs and other systems based on different technical methods. In this context the term "videogram" is used even if it has not gained the same acceptance in English as in French.

There are at present a great number of systems already on the market or under development. In general terms the systems are of two different kinds in respect of performance and capability:
- systems for replay of recorded material; in general these systems are based on new technical methods invented by electronic industries. The recording of material is only possible on an industrial level due to the high costs and the technically complex methods used. Examples are: EVR, SelectaVision and present-type videodiscs (Teldec by AEG - Telefunken, Videodisc by Phillips Discovision by MCA).
- systems for replay and recording; these systems are generally based on existing methods which have been developed towards more simplified and less expensive forms. These are two basic kinds:

a) systems based on the use of videotape in the cassettes which makes possible three uses : replay of recorded programmes, recording from the television set or recording of own production with an electronic camera, examples are the systems launched by Philips, Sony Ampex, AVCO, Victor Hapan, Marsushita, etc.

b) systems using ordinary film; recording is thus possible only with a normal film camera, and the film must be processed in a laboratory; such systems are manufactured by Vidicord (UK), Normende (Germany), Kodak (USA) etc.

However, even within these groups there are great differences between the various systems developed by different industries. If the multiplicity of systems has been and probably will continue to be a serious obstacle for a wide-spread acceptance of such video-systems, a further difficulty is caused by the different television standards in the world. Equipment designed for use on 525 lines and 60 cycles (North America, part of South America and Asia). Only systems using ordinary film avoid this constraint but have in turn other drawbacks. The disparity between the various colour TV systems (NTSC PAL, SECAM) can be solved either through the use of a multi-standard television set or through the use of a multi-standard player with similar cassettes.

Problems of standardisation arise in further areas such as within and between individual systems, between the barious recording and playback processes, between the various types and formats of programme carrier material and between various designs of cassettes.

2. Markets and Concerned Sectors

2.1. Markets

Markets for videogrammes are first of all related to the availability and degree of penetration of television, mainly in colour sets. The large markets would therefore be restricted to those countries where television is widely introduced.

Some years ago, during the first euphoria, wildly optimistic evaluations were presented. These seem now to have been tempered but most market studies still are mostly based on suppositions since the products have still not been commercialised on a sufficient scale to allow firm judgements.

In general, a distinction has been made between two main market categories:

2.1.1. The Institutionalised Market

Under this category would fall al institutions, groups, associations etc. that might be able to find a use for videogrammes in their current activities. To this group are counted educational institutions of various kinds, hospitals, shipping, aviation and transport companies, libraties and information centres, labout unions, churches as well as various professional groups (doctors, nurses etc.)

2.1.2. General Public

While present prices restrict the use of videogrammes almost exclusively to the institutionalised market, there are great expectations for a mass market at a later stage.

Any evaluation of this market must solve a number of difficult problems concerning such issues as the probable consequences of shorter working hours and longer weekends or holidays, the manner in which individuals, households and groups will budget the use of their free time, the interaction between various media and other occupations, the development in the educational sector, etc. Of more practical importance are such aspects as the standardisation of equipment, the increase in colour television ownership, the simultaneous availability of both equipment and programmes.

2.2. Concerned Sectors

Industrial and commercial enterprises in a number of sectors are directly involved in the production and distribution of hardware and software. Moreover, a number of other sectors in society will either wish to avail themselves of this new technology or will be directly affected by activities in this field.

In terms of current activities, the following sectors would in different ways be involved or affected.

2.2.1. Sectors concerned with the manufacturing and production side

2.2.1.1. Electronic Industry

The electronic industry has been and still is the single most important sector active in the videogramme field, Videogrammes were in fact introduced on the basis not of expressed requirements either from institutions or the general public but of action taken by a certain number of electronic industries.

The reason for this action seems two-fold. One is the intention to increase the sales of television sets which would be supported through the addition of a further method of using the set. Another is related to the fact that there had been no new major electronic consumer article on the market since the introduction of the colour-television set.

It should be noted that videocassette and video-disc systems have been developed in a few countries only (Germany, Holland, Japan, UK, US) and that the manufacture and commercial exploitation in other countries will take place through affiliated companies or on licence.

2.2.1.2. Finance Groups, in particular Banking Firms

In many countries, the large commercial banking firms or groups hold dominant positions with regard to both the electronic industry and software producers.
These firms would thus be involved and interested in revenues, not only from the fabrication and sale of programmes.

2.2.1.3. Publishing Industry

The publishing industry whatever its form of activity (books, press, records, etc.) has an immediate interest in any new medium for the transmission of information.

Of these, the record industry is generally associated with the electronic industry, in some cases with multi-purpose conglomerates with interests also in music publishing. One objective is to find a new form for the presentation of the artists with whom the companies hold exclusive contracts.

The press has often experienced new media as disruptive competition, particularly at the local level. Therefore, in many countries the press follows the development of the videgram industry with great interest - and concern. Certain press groups envisage the production of audio-visual magazines for mass distribution.

While earlier, the book publishing industry seemed to regard audio-visual media as a menace only, there now seems to be a trend towards treating the audio-visual field as an extension of its current activities. Publishing companies in a number of countries have entered the videograme fields as producers and distributors.

2.2.1.4. The film industry

The film industry which already had to cope with the advent of television obviously and similarly to the publishing industry, has a double reason for direct concern and involvement. The new medium would be a competitor but could also serve a s a new distribution method

for its products. In general, the involvement takes the form of making available archives and stocks of films and of participation in the production of cassette programmes.

2.2.1.5. Television organisations

So far, television organisations except for those with a direct involvement in the videogramme industry have in general taken a somewhat defensive attitude towards the new medium, seen mainly as a competitor. At the same time, there are plans to utilize the stock of programmes and material in the possession of the television organisations for videogramme distribution. The main issues are the policy adopted by the television organisations and the need to provide a solution to problems concerning copyright and neighbouring rights.

To this category may also be added television production companies. In general such companies are affiliated with the electronic enterprises, publishers or television organisations.

2.2.1.6. Societies of authors, performing artists, etc.

While holders of rights of various kinds (authors, directors, performing artists, etc.) find themselves confronted with a new medium which, on the one hand presents new job opportunities, on the other an unexpected utilization of their work. With regard to the latter case, they wish to obtain a renumeration proportional to the quantity and price of sales. In europe, at least, these matters will be handled by the national association of the various holders of rights.

2.2.1.7. Government authorities

Generally, activities associated with the production and distribution of videogrammes would fall outside government involvement. However, in some countries, fears have been expressed over possible monoply situations. For this reason, governments in some countries have taken a more active role; for example, in Sweden a government-controlled company was set up which was requested to conduct a series of studies and follow developments so that if a commercial monopoly were established it could undertake productions itself.

2.2.2. Sectors concerned with the use of videogrammes

While there is still much uncertainty about a generalised use by the public at large, a number of institutionalised sectors show great interest in the use of videogrammes.

2.2.2.1. Public authorities and services

In this sector, interest has been expressed for a wide range of purposes such as information, training and education. In particular, videogrammes are seen as having an important role in activities within the training and education sector since they are felt to provide a more flexible audio-visual means than such traditional methods as television broadcasting or films.

2.2.2.2. Industry and commerce

Within these sectors a number of uses are eavisaged:
- support for programmes of professional training, information etc.
- support for communication within enterprises
- support for sales campaigns

2.2.2.3. Political parties, labour unions, churches, etc.

Within organisations and associations in various fields (political, religious, educational, labour, etc.) video-grammes might provide a new means of providing information.

2.3. Sectors concerned with the distribution of videogrammes

In respect of the general distribution of videogrammes, interest has been expressed by almost all enterprises now involved in the distribution of printed or audio-visual material.

2.3.1. Publishing and book commerce

Plans have been formulated for the inclusion of videogrammes in the range of material now sold through publishing outlets and book-stores.

2.3.2. Electronic equipment and record commerce

Stores now selling records would wish to add videogrammes to their sales which, as is now the case, would often be combined with the sale of electronic audio-visual equipment.

2.3.3. Press distributors

Large enterprises specialising in the distribution and sale of daily papers, reviews and magazines, certain ranges of books, mainly paperbacks, have indicated interest in adding videogrammes to their sales range.

3. Structure and organisations

The organisations so far involved in this field are mainly of a commercial nature. The situation is very fluid and depends on the fortunes of the different systems.

In general terms, two kinds of enterprises take an active part:

- enterprises which have developed the hardware and which also to a lesser or greater extent are involved in production and other software aspects
- enterprises mainly concerned with the software.

In this context, indications will concentrate on the software aspects, in terms of organisational structure and production activities.

3.1. Organisations concerned with programme and other software aspects

The situation is fluid with regard to software aspects in particular programme production for cassette systems. Among the discernible trends can clearly be seen alliances between the manufacturers of hardware and those organisations that now control the media, as well as associations between organisations dealing with production, publishing and distribution. So far, there seem to be a few new organisations having entered the field.

In the following will be given a summary of organisational patterns in software production and distribution that are now emerging. These can be classified as: the hardware manufacturers, existing media institutions, new combined enterprises and new distribution forms.

3.1.1. Hardware manufacturers

As was pointed out earlier, some of the hardware manufacturers also enter the software field, particularly programme production. Typical examples are:

3.1.1.1. EVR

The EVR is primarily intended for the institutionalised market since the high costs of both players and cassettes make mass distribution uncertain. In principle, two methods are applied : recorded programmes are offered through a catalogue and programmes are produced on request.

The EVR catalogue offers:
- programmes of general interest: a 20th Century Encyclopedia, an audio-visual monthly magazine, a series of film classics
- programmes of an educational and informational nature, often addressed to professional groups, such as doctors and nurses

The EVR Partnership has concluded contracts for the production of programmes, for the utilisation of film archives and for the distribution and sale of EVR cassettes. As the main examples may be mentioned:

a) Canada: the EVR Partnership has taken over contracts originally concluded by CBS with the National Film Board for the use of their archive and with Pathe-Bellevue for the production of programmes and distribution of cassettes.

b) Germany: a contract with the production company, Videothek which is affiliated to the publishing firm, Bertelsmann Verlag.

c) France: an association with Librairie Hachette which also had production capability through its daughter company Tele-Hachette.

d) in the United Kingdom contracts have been concluded for the use of the educational programmes of the BBC and for the use of the film archives of certain industries such as British Motor Corporation, Leyland, IBM and Imperial Chemical Industries. A number of contracts have also been made with companies which produce programmes for themselves on behalf of clients (Associated Television, Granada, Crown Cassette Communication, ICEM etc.)

e) in Swizerland EVR Partnership works with the publishing firm Edition Rencontre through its department Rencontre TV and with CADIA (Communaute d'Action pour le Developement de l'Information Audiovisuelle) also affiliated with Rencontre, which in turn is affiliated with CIBA, one of the three shareholders in EVR Partnership. CADIA intends to produce and distribute scientific, medical, agro-chemical, cultural material for information and training.

f) Japan: affiliation with Mainichi EVR System which forms part of the publishing group Mainichi Newspaper Publishing Corporation.

3.1.1.2. AVCO-Cartrivision

AVCO has access to existing film through its affiliate production company AVCO Embassy. Agreements have been made with United Artist and British Lion Film for the production of new film series. The commercialisation and distribution of the cassettes will be handled by a specially created affiliate Cartridge Television.

3.1.1.3 Philips VCR

Philips has set up a company for the production of programmes and acquisition of rights. Other production companies like Telescan in Denmark will contribute with production of programmes and provision of cassette copies on request.

3.1.1.4. Diversified companies

In a special situation are those hardware manufacturers that are part of conglomerates also dealing with various aspects of programme production. Typical examples are CBS and even more RCA whose affiliated companies are active in the broadcasting, record, publishing and educational industries. In this case, the hardware and software aspects can be closely integrated from the beginning through available film and television archives, production companies, availability of copyrighted works and contracts with artists.

b) a number of other institutions have entered or intend to enter the videofram field, such as IRFA which is sponsored by the Institut de l'Audiovision Medicale, TEAMA International, which intends to work primarily for the pharmacies, etc.

3.1.2.5. Other countries

The same trends can be seen also in other countries
a) in Holland, the VNU (Verenigde Nederlandse Uitgeversbedrijven) a press publication concern has set up a production department and participates in the activities of other specialised companies

b) in Italy, the major publishing group, Mondadori, intends to add videocassettes to their activities

c) in Sweden, two important industrial groups with major interests in publishing have jointly set up EBAV (Esselte - Bonnier Audio-Visual).

3.1.3. Specially created organisations

So far, there seem to be few organisations, specifically created for cassette production and/or distribution apart from affiliate companies established by existing media institutions (such as Videogrammes de France etc.)

There are, though, some examples:
a) in France, the In Magazine, has been set up to produce cassette programmes which are shown to the "captive" audience in "salon de coiffure".
b) a multi-national consortium Nord Cassette with headquarters in Oslo has been set up by companies specialised in press distribution which wish to add the distribution of cassettes, for rent or sale, to their previous activities. Nord Cassette comprises the main press distribution enterprises in Denmark, Finland, Norway and Sweden.

3.2. International Groupings

3.2.1. Certain efforts have been made, particularly at the European level to co-ordinate policies and activities, either through existing associations such as the European Broadcasting Union (EBU) or through specially created bodies.

Of these recently restablished bodies, the most important is the International Publishers' Audiovisual Association (IPAA). It was established in 1970 in Zurich and groups the following publishers:

- C. Bertelsmann (Germany), Bonniers (Sweden), Esselte Group (Sweden), Grüher & Jahr (Germany), Librairie Hachette (France), A. Mondadori (Italy), Editions Rencontre (Switzerland), VNU (Holland).

The objectives of the Association are to co-ordinate audio-visual policies and activities of its members at the international level, to promote the exchange of ideas and experience, to facilitate the production and distribution of audio-visual programmes undertaken by its members.

The IPAA has set up three commissions for the study of legal problems, particularly in the copyright field: technical problems with a view to promote standardisation of equipment; programme issues including market studies.

3.2.2. In order to widen their activities and reach international audiences, certain multi-national comapnies for the production and/or distribution of video-grammes have also been set up. Examples are:
- Cassette International, Brussels which groups Hachette (France), Harmann-Montanus (Germany), Nord-Cassette (Scandinavia), Schmidt Agence (Switzerland), Smith & Sons

(United Kingdom) .
-Nord-Video, Stockholm, which comprises some of the main publishing houses in Denmark (Gutenberghus and Gyldendal), Norway (Gyldendal Norsk and Mortensen) and Sweden (EBAV).

4. Programmes and Experiments

4.1. General

The programmes and material that can be made available on videograms are basically of four kinds:
- already existing programmes and material, often produced for other purposes (cinema, television etc.) which are transferred to cassettes or discs and made available through sale or renting
- original productions undertaken specifically for videogram use; these will either be programmes for general distribution or productions undertaken, often on request, for particular and specified purposes (training courses, sales campaigns, etc.)
- non-professional production undertaken by groups or individuals for their own use ("electronic home-movies" etc.)
- in systems with frame stop capability it is expected that the use for information storage and retrieval might become extremely important. Any kind of printed, graphic or visual material could be displayed over such systems which thus would fulfill similar functions as various micro-fiche systems.

4.2. Transfer of existing programme material

Various examples of this kind have already been mentioned. With a more generalised use of videogram systems, it is expected that the large existing collections of audio-visual material and programmes could be available in a more individualised and accessible form.

4.3. Original productions

While so far activity in this field has been relatively limited, there are a number of productions undertaken which point to the emergence of certain patterns of use:

a) "In-house" training and information in industrial and commercial enterprises.
- The American insurance company, "Equity", has installed some 1200 EVR players and set up a rotation system for the cassettes; the programmes are designed for information and training of staff with the intention of increasing information outlets as a substitute for lectures and viewing rooms
- Coca-cola has installed Sony VCR players in some 200 affiliate bottling companies to show information and training programmes.

b) Sales campaigns
Some companies (e.g. Ford) have started to use cassettes for the presentation of new products to their sales staff and to customers

c) Professional information and training
In a number of countries, videograms are produced and distributed, often under the sponsorship of pharmaceutical and medical supply firms, to doctors and nurses (US, France, Germany). Such uses could obviously be extended to other professional groups.

d) General education and information
There are a number of examples of this application. Time-Life Video produces videocassette which contain accelerated reading course, health subjects, social and community relations, et

e) Programmes for educational institutions
In 1972 started what has been termed the largest project ever using videocassettes: a video library for high schools in Japan, intended to inform school leavers of various industrial sectors, and of career prospects in different companies. Mainichi will install EVR players in about 1000 schools and the number of copies required is estimated to

reach 100,000.

f) Audio-Visual magazines

Some production enterprises have introduced the concept of regular audio-visual magazines. Time-Life has launched a quarterly cassette magazine on economic affairs and other similar projects are under preparation in other countries.

g) "Captive Audiences"

A special category of productions are aimed at "captive audiences" in various situations. Examples are the cassettes provided by the French In Magazine to top hairdressing salons, the French series PROMAMAN for use in maternity wards, productions for use by hotel guests, in airports, etc.

h) Hobbies and sports

Various programmes are released which address themselves to individuals interested in a hobby or a sport; these are often of the "how to..." kind. Examples are "How to play golf", a "Wine guide", both produced by Time-Life.

i) Other projects

In the UK and Sweden, plans are advancing for equipping tankers and other merchant vessels with video playback facilities. Programmes for the crews will include recordings of national television programmes, and feature films.

Documentation;

Much of the material that has been published consists of presentations by the manufacturers and production enterprises, articles in the specialised and general press, market analyses etc.

Of studies of a more general interest may be mentioned:

Bruhn, Wolfgang:
Die Entwicklungsmöglichkeiten der Bildschirmkassetten.
Fernsehinformationen, März 1971.

Fellows, James et al:
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National Association of Educational Broadcasters, Washington D.C., 1971.

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Video cartridge, cassette and disc player systems.
Society of Motion Picture and Television Engineers Inc., New York, October 1971.

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Video Cassettes: the Systems, the Market, the Future.
Roberts and Associates, Inc., Beverly Hills, California 1971.

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Video player and recorder systems for home use. Technical Centre, EBU Brussels, March 1971.

V. NEW FORMS OF VIDEOPRODUCTION

1. General

The development and availability of the new light video-production equipment, in particular the 1/2 inch and 1 inch videotape facilities, have changed the conditions for video-production. Previously video-production could only be undertaken on a professional basis and therefore almost exclusively used by mass media institutions. Now, "television" can become a medium for groups and individuals, for the development of local action and participation by the public. The distribution can take place over cable systems, closed-circuit television or simply through the exchange of tapes and group viewing.

These new technical means thus make possible a more diversified production intended not for a mass audience, but for smaller, specific audiencies.

This "alternative television" has evolved particularly in Canada and the U.S.A. It has just started in Europe, where the distribution conditions are entirely different, due to the legal status given telecommunications and broadcasting.

So far, these new means have mostly been used for social communication at the local level and for "counter-information" (guerilla television). In North America the means of production are often put at the disposal of various groups by official institutions (universities or other educational institutions, nistries) or by private fou.:ations, etc.

There are a large number of groups and activities involved. In this context, it will only be possible to mention some significant examples.

2. Vidéographe

The Vidéographe in Montreal is one of the most interesting projects undertaken within the framework of Challenge for Change (Société Nouvelle), an experimental programme designed to improve communications, create greater understanding, promote new ideas and provoke social change. Challenge for Change is established by the Government of Canada as a participation between the National Film Board and certain federal government departments and government agencies.

The Vidéographe is essentially a centre for production, screening and distribution of audio-visual productions, open to all and set up in order to "democratize the videotape".

For production, the basic principle is for a group to propose a project. The programme committee which consists of the seven permanent members of the Vidéographe decides whether the proposal is to be accepted. If so, the equipment is put at the disposal of the group as well as a budget which averages about $1,400 per production. Once the programme is finished, it is decided whether it will only be shown in the videotheatre or distributed to other groups.

After the first five months, 220 projects had been proposed, of which 50 had been accepted and 26 finished. The average duration of productions was about 30 minutes; the age of the producers was from 8 to 60, the average being 24.

The Vidéographe has also set up a system for distribution of programme copies on the one hand for universities, community cable television groups, cultural centres, associations etc., on the other for anyone who applies for a programme.

Another experiment under the name of Selectovision gave the opportunity to cable subscribers in Beloeil near Montreal to choose their own programmes: each subscriber was given a list of 80 available productions, called the cable studio, indicating the programmes of his choice; depending on the number of requests, programmes were then immediately transmitted over the cable systems.

Organisations

National Film Board of Canada, P.O. Box 6100, Montreal 101, Quebec.

Vidéographe, 1604 Saint-Denis, Montreal 129, Quebec.

Documentation:

Challenge for Change
Newsletter (three or four times a year) published by National Film Board of Canada.

Le Vidéographe, undated

Robert Forget:
L'Experience du Vidéographe, Sonovision 31.5.1973.

There are also a number of other videogroups, particularly in Toronto, Quebec and Vancouver

3. USA

Since 1967, a number of videogroups have been active in various parts of the country. Some of them have been tied in with other activities (environmental, multi-media events etc.) but many have concentrated on community issues of various kinds.

Information on such groups often rapidly becomes outdated; however, a list of known groups includes:

Community Video
2515 Q. Street NW, Washington D.C. 20007

Community Video Center
Federal City College, 1411 K Street NW, Washington D.C. 20005.

Earth Light,
26 Austin Street, Cambridge, Massachusetts.

Experimental Video
797 J.B. Acevedo Street, Rio Piedras, Puerto Rico 00923

Global Village,
454 Broome Street, New York, New York.

Kailasa Jon Shafer
1510E. 23rd Street, Minneapolis, Minnesota 55404

Open Channel
220 West 42nd Street, New York, New York 10036

People's Video Theatre
Raindance, 24 East 22nd Street, New York, New York

Santa Cruz Community Service Television
Johnny Videotape and Friends, 465 Ninth Avenue, Santa Cruz, California.

Urban Video
405 East 56th Street, New York, New York 10021

Vegetables Group, Miami, Florida.

Video Free America,
San Francisco, California.

Video Freex
Maple Tree Farm, Lanesville, New York 12450

4. Europe

As mentioned earlier, only few activities of this kind have been undertaken in Europe. Various groups have been working within the framework or artistic events (exhibitions, multi-media presentations, etc.) but experiments in social communication are relatively few.

In France a number of experiments have been initiated or supported by the Service de la Recherche of the ORTF. The objectives have been to study and develop the use of light video-equipment as a means of communication for the self-expression of individuals and groups, for inter-group communication and for dissemination of local events with provision of feedback. These experiments have for the most part involved various groups.

In a series of projects carried out in Carpentras (Vaucluse) in July 1972, interested inhabitants were taught how to handle the equipment and requested to undertake the entire production. Apart from productions on various aspects of local life, another project in a nearby village made it possible for two antagonistic groups to record their views and confront them in public. Through temporary installations, a meeting of the municipal council was disseminated to sets in streets and in cafés, provided with feedback facilities which made possible a dialogue between the citizens and the members of the council.

Experiments and projects of various kinds have also been undertaken by certain Maison des Jeunes et de la Culture and other groups.

Documentation:

ORTF
Expériences de communication réalisées par le Service de la Recherche de l'ORTF; TV et éducation, no. 32, Avril 1973.

Videogroups active in Europe:

BELGIUM:
Radio Télévision Culture, Liège

Video Gulliver
14 rue du Roitelet, 1170 Brussels

Video Insas
8 rue Thérésienne, Brussels.

FRANCE:
Collective Vidéo
85 rue Rambuteau, 75001 Paris

E.R.E.C.
(Equipe de Recherche pour l'Expression et la Communication), 6 rue du Jardin des Plantes, 69 Lyon

Foudation Iota
Port de la Conférence, Pont de l'Alma, Paris.

IMedia
22 Boulevard Saint-Germain, 75006 Paris.

Maison des Arts et des Loisirs
71 Le Creusot

Marguerite Vidéo
30 rue Henri Barbusse 75005 Paris.

MK 2 Production
55 rue Traversière, 75012 Paris

Slon Vidéo
74 rue Albert, 75013 Paris

Vidéo Drop Out
18 rue de l'Odéon, 75006 Paris

Vidéo Imperia
75 rue Duteau, 75 Paris

Vidéo Poing
8 rue Martel, 75 Paris

Vidéo 00
30 rue du Pressior, 75 Paris

GERMANY (F.R. of):
Video Brian Wood
Astalerstrasse 8, 8000Munich

ITALY:
Vidéo Centre
Corso Garibaldi 28, Milan

NETHERLANDS:
Open Studio Herengracht
Gerengracht 156, Amsterdam

Video Meat-Ball
Hartogstraat 5 A, The Hague

SWITZERLAND:
Mediatelier
c/o Alex Ganty, Alfred Willener, Guy Milliard
7 rue Bâle, Lausanne

5. Other Countries

Also in other countries, a number of videogroups are active and various experiments are carried out.

One of the most interesting projects is TV 16 in Tanzania. This project is connected with the Ujamaa movement whose ideas formed the basis for the development policies which President Nyarere officially laid down in the Arusha Declaration of 1967.

The purpose of the project is to give an opportunity to the rural population in the Ujamaa villages to express themselves and to communicate to the authorities and other villages their experiences and problems. The villagers themselves saw the work of the videogroup as a means of communicating with the authorities. Recorded material from the villages on their most pressing problems was shown to various authorities. The replies, comments and suggestions from the authorities were in turn

recorded and shown to the villagers.

The video techniques have also been used to show the villagers their own reality so as to establish a dialogue between various groups.

The first phase of Tanzania TV 16 was financed through international aid given by Canada, Denmark, Norway and Sweden. The second phase will include the establishment of a Video Communications Centre at Dar-es-Salaam with number of technical teams at the disposal of the educational and rural development services; it will be assisted by the UNDP, Unesco and FAO.

Documentation:
Peter Schulz:

Articles in Unesco Information, May 1973
and Development Forum, Vol. 1, Number 2, March 1973.

V. FORECASTS

During the last years, various studies, articles etc. have been published on the foreseeable technical developments in the communications field and their implications for society and the individual. In this context, mention will only be made of more authoritative, particularly official, generally policy-oriented studies. These are still few in number.

1. Official studies and reports

1.1. President's Task Force (USA)

In a message to Congress of 14th August 1967, President Johnson transmitted a "recommendations relative to world communications which apart from policy statements concerning the American position with regard to Intelsat dealt with a number of domestic communications issues. A Task Force on Communications policy was established which inter alia was requested to study which technology could meet now communications requirements in the most effective and efficient manner.

The Chairman of the Task Force was Eugene Rostow and the report published in December 1968 also became known as the Rostow report. The final report dealt with the organization of the United States international communications industry; the future of Intelsat; satellite communications and educational television in less developed countries; domestic applications of communication satellite technology; the domestic telecommunications carrier industry; future opportunities for television; the use and management of the electromagnetic spectrum; the roles of the Federal Government in telecommunications. The Report includes a number of recommendations many of which were however not implemented by the Johnson or Nixon administrations.

A number of background papers were used in the preparation of the report; these include a survey of present and future telecommunications technology as well as studies on each of the subject matters dealt with in the report.
Final Report; President's Task Force on Communications Policy, December 1968.
U.S. Government Printing Office, Washington D.C.
Staff Papers; President's Task Force on Communications Policy,
U.S. Department of Commerce/National Bureay of Standards, June 1969

1.2. Telecommission (Canada)

In September 1969, the Minister of Communications announced plans for a comprehensive study of the present state and future prospects of telecommunications in Canada. This study was called the Telecommission. More than 40 separate studies were organized by a Directing Committee which was also responsible for the general report covering the main issues and problems disclosed by the individual studies, and presenting options for consideration.

The individual studies were grouped according to eight main sections: legal considerations; economic considerations; international considerations; technological studies; information and data systems; telecommunications environment; telecommunications and government; special studies.

The general report published under the title Instant World sets out the background of problems facing the policy-makers, and discuss the social aspects of telecommunications, the history of telecommunications in Canada and the present situation, the future based on a 20-years forecast of technological developments and the responsibility of government in the identification and protection of the public interest.

The Telecommission is probably the most thorough open-minded and lively official study made anywhere.

Instant World, Report on Telecommunications inCanada.
Information Canada, 1971.

1.3. Television Advisory Committee 1972 (UK)

As an example of the more limited studies carried out or underway in a number of countries may be mentioned the Report of the Television Advisory Committee 1972.

The Committee was requested to consider the situation after 1976 with regard to the radio frequencies allocated or likely to be allocated to broadcasting in the UK, present and future transmission techniques, videorecording and replay techniques.

The report discussed terrestrial broadcasting, cable television, satellite broadcasting, videocassettes. The report is supplemented with a number of papers prepared by a Technical Sub-Committee.

Report of the Television Advisory Committee 1972 and Papers of the Technical Sub-Committee, Ministry of Posts and Telecommunications, 1972. (Available from Her Majesty's Stationery Office)

2. Books, articles and other presentations

Books, articles etc. on the future of communications vary with regard to scope, purpose, quality and seriousness. The selection mentioned here is necessarily somewhat arbitary - it includes material which is significant or in other ways has proved to be useful.

2.1. In English

2.1.1. "Electronics" report of 1969

The American magazine Electronics published in its issue of November 24th, 1969 a special report on communications of tomorrow ("here comes the tuned-in, wired-up, plugged-in, hyperarticulate speed-of-light society")
The report discusses such technologies as satellites, facsimile, computers, telephones, microwave transmission etc. in an easy-to-read, journalistic style.

2.1.2. Science and technology report

The US magazine Science and Technology in its April 1968 issue ran a series of articles on developments in communications. The articles deal with such issues as the communications revolution; the computer as a communications device; diversity of broadcasting technology; network, transmission and switching technology; social trends and the need for a new communications policy.

2.1.3. Annenberg Symposium on Communication

The Annenberg School of Communications, University of Pennsylvania organized in March 1972 an international symposium on Communication:
Technology, Impact and Policy.
The subject matters dealt with include instructional technology; communications and computers; communications satellites; broadcasting technologies- institutional powers and controls; CATV; media and education; transportation versus communication; the implications of new communications technologies.

2.1.4. Bagdikian: The Information Machines

In the book The Information Machines: Their Impact on Men and the Media, Ben Bagdikian deals with the changes brought about by the combination of computers, innovations in transmission technology and new ways for the input and output of images. The book focuses on what the content of daily information will be, the form and method of distribution.
(Published by Harper & Row, New York)

2.2. In French

2.2.1. G. Métayer: Les systèmes électroniques de communication

This book gives an overview of current communications technologies (television, computers, cassettes etc.) envisaged trends and future uses.
(Published by Les Editions D'Organization, Paris 1972)

2.2.2. J. L. Servan-Schreiber: Le Pouvoir d'Informer.

Under the title "The power to inform" Jean-Louis Servan-Schreiber has published a major study of the media and the changes brought about by the new technology. While particular attention is paid to the press, there are also chapters on broadcasting, cable television, videocassettes and new electronic means of producing graphic and video information.
(Published by Robert Laffont, Paris)

2.3. In German

2.3.1. H. Lenhardt: Die Zukunft von Rundfunk und Fernsehen

Helmut Lenhardt, Administrative Director of Oesterreichischer Rundfunk (Austrian Broadcasting Corporation) in 1972 published a book on the future of radio and television in relation to the new electronic media.
This work particularly discusses the development of electronic media from a financial point of view and in the light of the overall national economy.

2.3.2. W. Nestel: "Nachrichtentechnik"in" 1980 ist Morgen"

In a number of publications on future developments generally are also included chapters on communications. A succinct report by Werner Nestel is to be found in the book "1980 ist Morgen" (1980 is tomorrow); the article mainly deals with broadcasting technology and data transmission.

2.4. Special studies

2.4.1. ITU

Apart from the official documentation, the ITU publishes in the Telecommunications Journal articles of dealing with the future of telecommunications, mainly from a technical point of view. As recent examples may be mentioned:

- Busignies, H.: The Future of Telecommunications and their Influence on Mankind; Vol. 38 - IV/1971

- Terrault, C.: Planning the Telecommunications network of the Future;
Vol. 40 - V/1973

- Métayer, G.: From Cable Television to High-Capacity Communication Networks;
Vol. 40 - III/1973